



FINAL NOTICE OF CERTIFICATION

Turner Designs TD-4100 On-Line Hydrocarbon Monitor

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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Final Decision to Re-Certify a Hazardous Waste Environmental Technology

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) hereby re-certifies the following company's hazardous waste environmental technology:

Turner Designs TD-4100 On-Line Hydrocarbon Monitor

Chapter 412, Section 25200.1.5, Health and Safety Code (enacted by Assembly Bill 2060, 1993) authorizes the DTSC to certify the performance of hazardous waste environmental technologies. Hazardous waste environmental technologies are certified pursuant to implementing regulations found in Title 22 of the California Code of Regulations (CCR 22), Chapter 46, Section 68000. Only technologies that are determined not to pose a significant potential hazard to the public health and safety or to the environment when used under specified operating conditions may be certified. Incineration technologies are explicitly excluded from the certification program. The purpose of the certification program is to provide an in-depth, independent review of technologies at the manufacturer's level to facilitate regulatory and end-user acceptance and to promote and foster growth of California's environmental technology industry.

DTSC makes no express or implied warranties as to the performance of the manufacturer's product or equipment. The end-user is solely responsible for complying with the applicable federal, state, and local regulatory requirements. Certification does not limit DTSC's authority to require additional measures for protection of the public health and the environment.

By accepting certification, the manufacturer assumes, for the duration of certification, responsibility for maintaining the quality of the manufactured equipment and materials at a level equal or better than was provided to obtain certification and agrees to be subject to quality monitoring by DTSC as required by the statute under which certification is granted.

DTSC's decision to certify was published in the California Regulatory Notice Register, volume 2000, No. 36-Z, pages 1493-1496 on September 8, 2000 and has been subject to public review and comment. Written comments were not received.

An Evaluation Report supporting the Department's decision is available for review at:

California Environmental Protection Agency
Department of Toxic Substances Control
Office of Pollution Prevention and Technology Development
P.O. Box 806
1001 I Street, 12th Floor
Sacramento, CA 95812-0806
Attn.: Dr. Ruth R. Chang, (510) 540-2651

A description of the technology to be re-certified, the certification statement, and the certification limitations for the technology of the company listed above follows.

CERTIFICATION PROGRAM (AB2060) FOR HAZARDOUS WASTE ENVIRONMENTAL
TECHNOLOGIES
TECHNOLOGY CERTIFICATION

Technology:

TD-4100 On-Line Hydrocarbon Monitor

Manufacturer:

Turner Designs, Inc.
845 West Maude Avenue
Sunnyvale, CA 94086
Tel. (408) 749-0994.

Technology Description

The technology is based on the principle of fluorescence detection in an aqueous stream irradiated with ultraviolet light from one of three available light sources. The light source generates UV or near-UV light that is passed through an excitation light filter chosen by the manufacturer. The selection of filters is based on information provided by the user regarding the characteristics and variability of the matrix and analytes of concern. The filtered excitation light enters a non-contact, non-fouling measurement cell containing a continuous-flow, laminar, free-falling aqueous stream. Any fluorescent compounds in the stream that can absorb the chosen wavelengths of excitation light, fluoresce at characteristic wavelengths. The fluorescence emissions pass through another filter, at 90 degrees from the excitation light, and are collected in a photomultiplier detector. A dual-beam optical design alternates between measurement of the filtered source light, dark current, and the filtered fluorescence emission light. Proprietary electronics convert the raw signal into readable units, displayed on an LCD screen as either fluorescence units or concentration, or into a signal suitable as an input into a data logger. The compounds responsible for the signal are aromatic hydrocarbons of molecular weights ranging from benzene to polynuclear aromatics. Filtered excitation and fluorescence detection wavelengths, respectively, are for BTEX (including benzene), 254 nm and 280 nm, for gasoline, 254 and 330 nm, and for diesel fuel, 254 and 365 nm. The manufacturer also offers excitation

and fluorescence filter sets for crude oil (wide band), 300-400 and 410-610 nm; and for crude oil (high blank condition), 300-400 and 400 nm. The excitation and fluorescence filters are interference filters which meet Turner Designs' specifications.

Certification Statement

Under the authority of Section 25200.1.5 of the California Health and Safety Code, the Department hereby certifies the TD-4100 On-line Fluorometer manufactured by Turner Designs, Inc., 845 West Maude Avenue, Sunnyvale, CA 94086 as a Measurement Technology for the continuous on-line monitoring of gasoline, benzene, toluene, ethyl benzene, xylenes (BTEX), and other petroleum products in water by virtue of their aromatic hydrocarbon content.

The TD-4100 is semi-quantitative in that it detects petroleum-derived products and pollutants in terms of a pre-set fluorescence level or in terms of levels set by calibration with benzene, gasoline, diesel, or other petroleum product. Detection levels in deionized water are about 1000 ppb for benzene and 5 ppb for diesel fuel or gasoline. In ambient and industrial waters, detection levels of 50 to 200 ppb are more typical. The dynamic range typically extends over three orders of magnitude. The relationship between concentration and fluorescence over this range is non-linear, although, for practical purposes, linearity extends between one and two orders of magnitude about chosen target levels. Within appropriate concentration ranges, comparison of fluorescence readings with results of laboratory analyses has shown correlation coefficients of 0.98 or better. The TD-4100 has been shown to be capable of maintaining a signal stable within about 5% over ten weeks.

A critical element of the technology is the manufacturer's commitment to match light source, excitation and fluorescence filters to a user's needs in terms of type of product to be detected, level of detection, and type and level of site-specific interferences (including interfering chemicals, changes in turbidity, or fluorescing particles such as algae), and establishment of an expected level of on-site performance based on these evaluations and prior to sale and installation of the equipment.

The use of a window-less measurement cell eliminates a principal source of signal attenuation. Stability of the signal is still dependent on the geometry of the sample stream, which is affected if a deposit is allowed to build up in the piping system leading to the measurement cell. Periodic calibration checks, replacement of the source lamps, and other maintenance must be performed by the user in a manner prescribed by the manufacturer.

The TD-4100 is equipped with alarm and signal circuits to allow the automatic interruption of an industrial inflow or effluent and alert the operator when a pre-set level of the target hydrocarbon is exceeded. As the signal may be affected by changes in temperature, the user must consider temperature changes in outdoor use.

The variability of the background and composition of the hydrocarbons being monitored will affect the sensitivity, accuracy, and precision of measurements. Differences in aromatic content of gasolines may affect their detectability by fluorescence.

Limitations of Certification

The Department makes no express or implied warranties as to the performance of the manufacturer's product or equipment. The Department has not conducted any bench or field tests to confirm the manufacturer's performance data. Nor does the Department warrant that the manufacturer's product or equipment is free from any defects in workmanship or material caused by negligence, misuse, accident, or other causes.

The Department believes, however, that the manufacturer's product or equipment can achieve performance levels set out in this Certification. Said belief is based on a review of the data submitted by the manufacturer and other information, and is based on the use of the product in accordance with the manufacturer's specifications.

This certification is subject to the regulations found in Title 22 of the California Code of Regulations (CCR 22), Chapter 46, Section 68000, which include the duration of the Certification, the continued monitoring and oversight requirements, and the procedures for certification amendments, and decertification.

By accepting this Certification, the manufacturer assumes for the duration of the Certification, responsibility for maintaining the quality of the manufactured materials and equipment at a level equal or better than was provided to obtain this Certification and agrees to be subject to quality monitoring by the Department as required by the law under which this Certification is granted.

Specific Conditions

The manufacturer shall use their established procedures to evaluate specific light source and filter combinations so as to optimize instrument response relative to known, interfering substances that may occur at a customer's site. This includes consultation of a database of instrument responses to known analytes and sample streams and, for new waste streams, testing on samples of the actual waste streams at the manufacturer's facility. The manufacturer may substitute optical parts in response to monitoring requirements for specific sample streams. With regard to such substitutions, the conditions encountered during the evaluation on which this Certification is based shall remain representative of Turner Designs' response to customer needs and overall quality management.

All equipment shall be manufactured from materials with corrosion protection for outdoor use.

Turner Designs shall maintain their standards for ensuring that users receive applicable training in operation and maintenance of the technology.

Through updates of user guides, Manufacturer shall inform the user of interferences and matrix effects which potentially affect the testing results as they become known to the Manufacturer.

Certification does not extend to the users' construction of a sampling intake to obtain

representative samples from high-flow streams of water or waste water and users' maintenance of such structures.

In cases where the results are to be reported as the concentration of a specific analyte, the user should calibrate the instrument using that analyte, and confirmatory results obtained using applicable U.S. EPA Office of Solid Waste SW-846 Test Methods.

Users shall provide the manufacturer with adequate information on the characteristics and variability of their waste stream so that the manufacturer can properly configure and calibrate the instrument. Users shall follow the manufacturer's instructions for installation, operation, and maintenance. The user should be aware of potential changes in the characteristics of their waste streams that may affect the ability of the technology to detect the analytes of concern. Users shall develop and follow a plan in accordance with their facility's quality management system for validating, at appropriate intervals, the TD-4100 through sampling and laboratory analyses.

Basis for Certification

This re-certification is based on the finding that the technology certified effective 5 May 1997 has been maintained by the manufacturer in its original configuration and that the quality of the manufactured product and consumer services have been maintained at a level corresponding to or higher than was provided at the time of the original certification. Specifically, in 1999 the TD-4100 has been evaluated by the U.S. Coast Guard and Transport Canada and was certified for specific applications such as bilge water monitoring on seagoing vessels. The company is working towards ISO-9001 certification and maintains customer service documentation to meet ISO-9001 requirements. The company has also developed a family of straightforward yet innovative solid probes which make it quite easy to detect changes in electronic response during on-line operation of the TD-4100. The solid probe therefore facilitates maintenance and can be expected to increase reliability of the technology in field applications. A listing of the documentation available for this re-certification is contained in an amendment to the Evaluation Report. The manufacturer has declared that certain submitted materials contain proprietary information and should not be subject to public disclosure. Recent telephone interviews of users, both nominated and not nominated by Turner Designs, showed a uniformly high level of satisfaction with the efficacy and reliability of the TD-4100 and the service provided by the company.

Recommended Applications

The Turner Designs TD-4100 fluorometer is intended for the continuous monitoring in the field or in industrial environments of aqueous streams containing petroleum fuels or other petroleum-derived pollutants. It allows automatic out-of-control alarms or signaling to shut down the monitored flow. Applications include preventing contamination of receiving waters with oily industrial effluents and storm water, and similar pollution of surface drinking water sources and groundwater. In most situations, and subject to those determinations which Turner Designs

carries out in cooperation with each prospective user, the TD-4100 allows monitoring at or below regulatory levels.

The TD-4100 greatly improves the monitoring regime through its continuous operation, and may substantially reduce the need for periodic sampling, improve data quality, and add to the protection of public health and the environment. In case of an alarm, the TD-4100 can alert the operator so that immediate sampling of the monitored flow may be conducted to determine the nature of the offending pollutants.

Regulatory Implications

DTSC's certification does not change the regulatory status of hydrocarbon testing; it is intended, however, to facilitate and encourage the acceptance of this technology where a project's data quality objectives can be met by its use. To this end, regulatory programs are encouraged to consider the Department's findings regarding this technology, depending on each program's objectives and constraint. State-regulated facilities may contact state permitting officers regarding the use of the technology for operational monitoring. Other local and state government permitting authorities may take this certification under consideration when making their permitting decisions. Project managers may consider using this technology where its use can contribute to the project and its data quality objectives.

Duration of Certification

This certification takes effect 30 days after the date of publication of this Notice. Unless amended or revoked for cause, this certification will remain in effect for three years.